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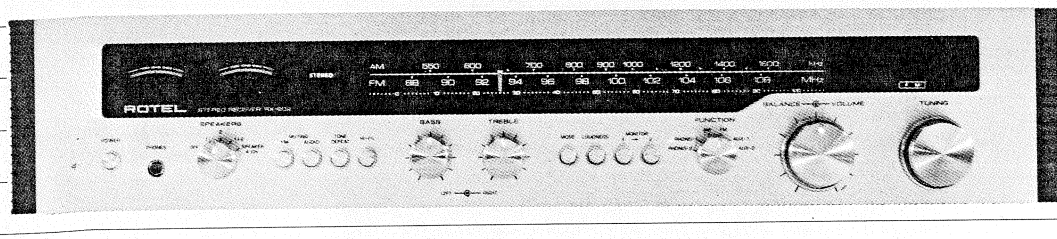
ROTEL®

RX-602

AM/FM STEREO RECEIVER



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TECHNICAL MANUAL

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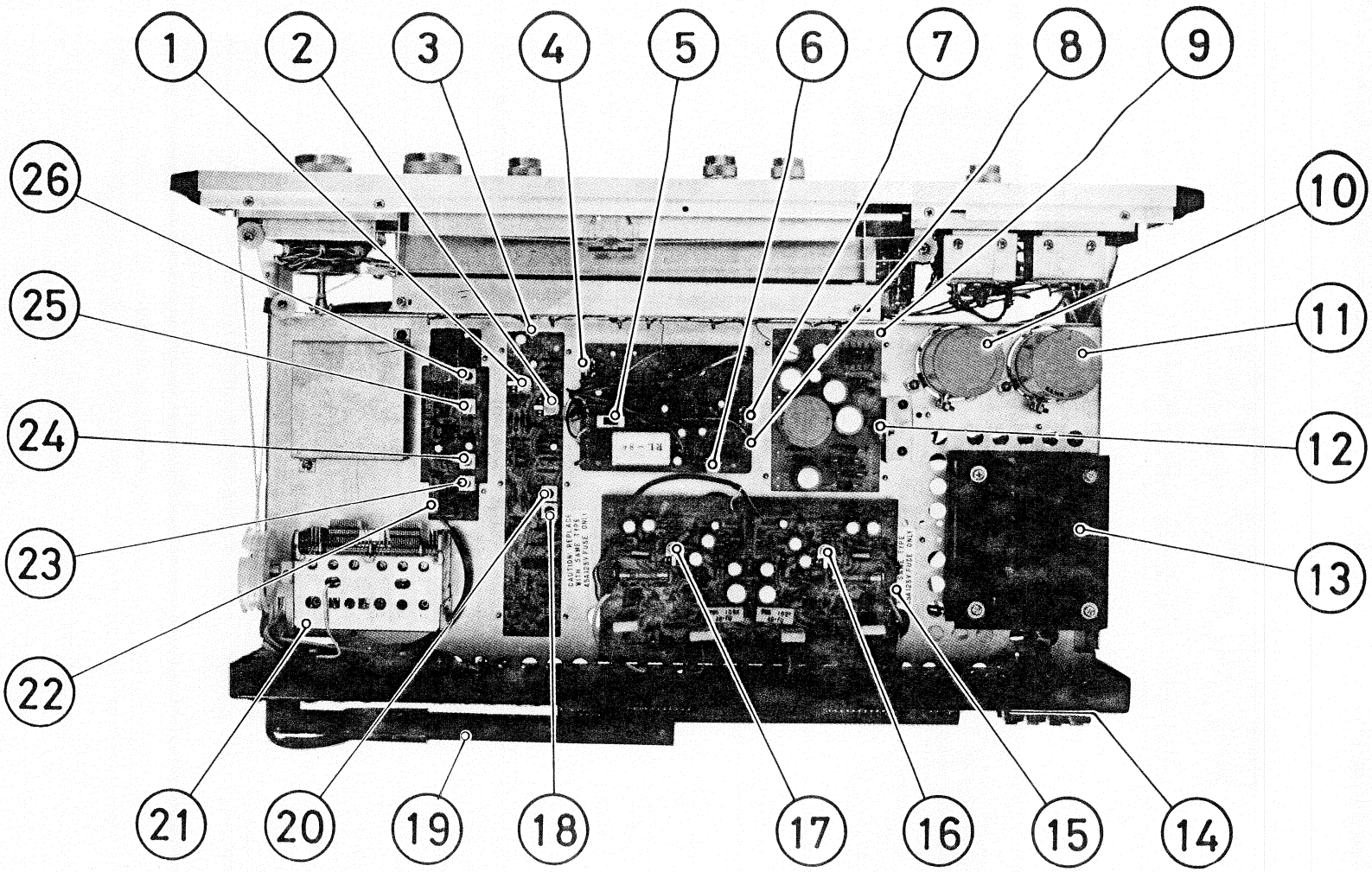
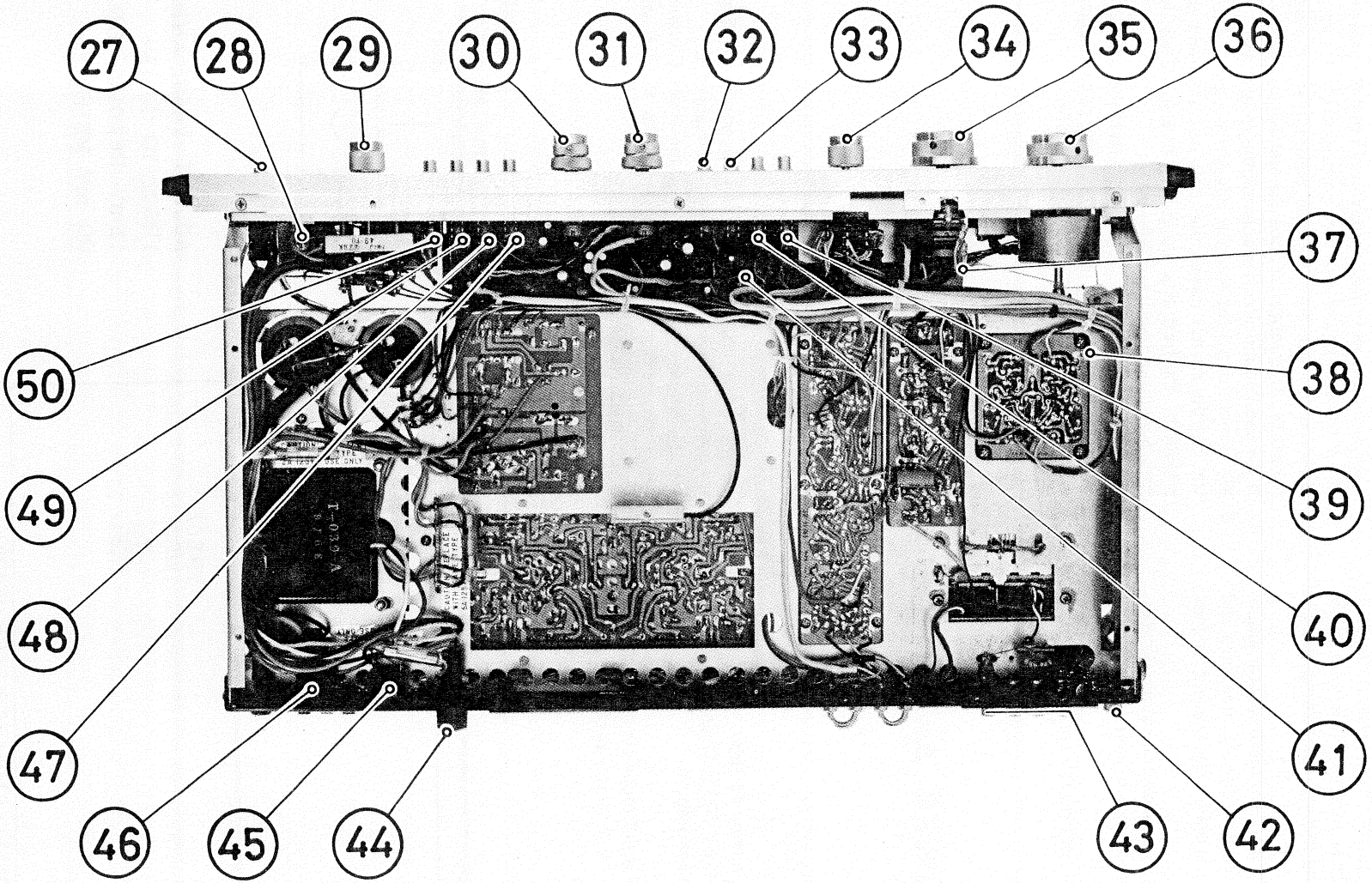
CHASSIS LAYOUT TOP VIEW



1. VR101, FM Signal Meter Level Adj.
2. VR102, FM Stereo Auto-switching Level Adj.
3. FM IF Circuit Board
4. VR301, FM MPX 19KHz Adj.
5. S12, De-emphasis Switch
6. VR302, FM Stereo Separation Adj.
7. VR303, FM Muting Level Adj.
8. FM MPX Circuit Board
9. Rectifier Circuit Board
10. C002, Smoothing Capacitor
11. C003, Smoothing Capacitor
12. Q901, Stabilizer
13. T001, Power Supply Transformer
14. Speaker Terminal Strip
15. Main Amp. Circuit Board
16. VR601, Bias Adj. (L-ch.)
17. VR602, Bias Adj. (R-ch.)
18. L101, FM IFT, Ratio (Pri.)
19. L003, AM Antenna Coil
20. L102, FM IFT, Ratio (Sec.)
21. AM/FM Front-end
22. AM Conv. & IF Amp. Circuit Board
23. L201, AM OSC., Coil
24. L202, AM IFT, 1st.
25. L203, AM IFT, 2nd.
26. L204, AM IFT, 3rd.

CHASSIS LAYOUT BOTTOM VIEW



27. S11, Power Switch
28. Headphone Jack
29. S10, Speaker Selector Switch
30. VR502, Bass Control
31. VR501, Treble Control
32. S4, Mode Switch
33. S5, Loudness Switch
34. S1, Function Selector Switch
35. VR701, Volume and Balance Control
36. Dial Tuning
37. Volume Control Circuit Board
38. Phono Equalizer Amp. Circuit Board
39. S3, Monitor-2 Switch
40. S2, Monitor-1, Switch
41. Tone Control Amp. Circuit Board
42. GND Terminal
43. Antenna Terminal Strip
44. AC Fuse
45. AC Outlet
46. AC Outlet
47. S8, Hi-Filter Switch
48. S7, Tone Defeat Switch
49. S9, Audio Muting Switch
50. S6, FM Muting Switch

PRECAUTIONS

1. Always disconnect the chassis from power line when soldering. Turning the power switch OFF is not enough. Power line leakage passing through the heating element may destroy the transistors and IC's.
2. Never attempt to do any work on the transistor amplifiers without first disconnecting the AC line cord and waiting until the power supply filter capacitors have discharged.
3. Replacement for output and driver transistors, if necessary, must be made from the same beta group as the original type.
4. If one output transistor burns out (open or short), always remove all output transistors in that channel and check the bias adjustment, the control and other parts in the network with an ohm-meter before inserting a new transistor. All transistors in one channel will be destroyed if the base biasing circuit is open on the emitter end.
5. When mounting a replacement power transistor, be sure the bottom of the flange, the mica insulators and the surface of the heat sink are free of foreign matter, for they may cause transistors failure.
6. Silicon grease must be applied between the transistor and the mica insulator, and between the mica insulator and the heat sink for better heat conduction.

POWER AMPLIFIER BIAS ADJUSTMENT

Instrument: DC milli-volt meter

- Set Volume Control to minimum position.
- Set potentiometers VR601 and 602 to Counterclockwise position before starting this procedure.

1. Connect the plus lead of a DC milli-volt meter to Test Point – Left ch. – (on main amp., pcb) and minus lead to Test Point 15.
2. Adjust the potentiometer VR601 to obtain a 7.5mV reading on the DC milli-volt meter (see Figure 1.).
3. Repeat the above steps 1 and 2 for Right Channel. (use Test Point Pin – Right ch. – Pin No. 16 and potentiometer VR602.)

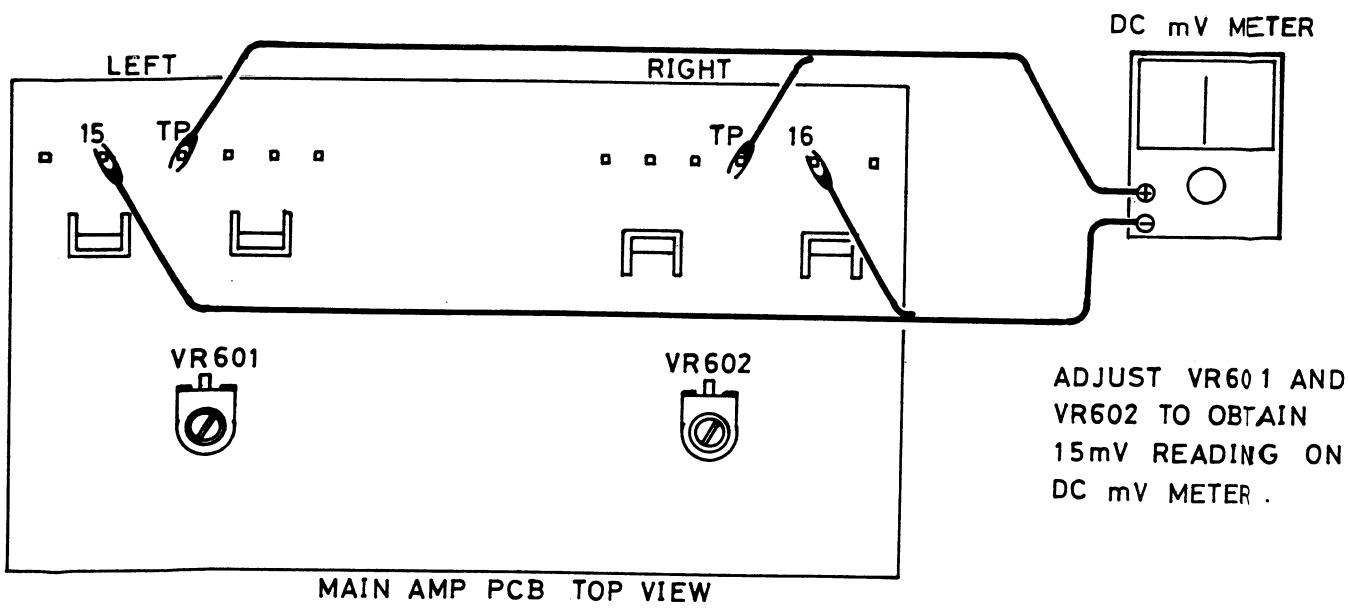


Figure 1. Bias (Idling Current) Adjustment Hook-up

AM ALIGNMENT PROCEDURE

Instruments: AM Signal Generator and AC VTVM.

NOTES: Set Selector switch to AM position.

Input signal must be kept as low as possible to avoid AVC action.

Step	Generator		Turning Dial Setting	Output Indicator Connected to	Adjust	Adjust for
	Coupling	Frequency				
1	Pin No.2 on IF board through a 0.01 mfd capacitor.	455 KHz (400 Hz 30% Mod.)	Non interfering at low end of scale.	AC VTVM to MONITOR-2 "OUT" jack	L204, 203 and 202 (on AM IF board)	Maximum reading on VTVM.
2	Connect to short loop of wire. Radiate signal into ferrite loopstick antenna.	600 KHz (400 Hz 30% Mod.)	600 KHz		L201 (OSC) (on AM IF board) and L003 (ANT)	
3		1400 KHz (400 Hz 30% Mod.)	1400 KHz		CT5 (OSC) and CT4 (ANT) (on Front end)	
4	Repeat steps 2 and 3 until no further improvement is noticed.					

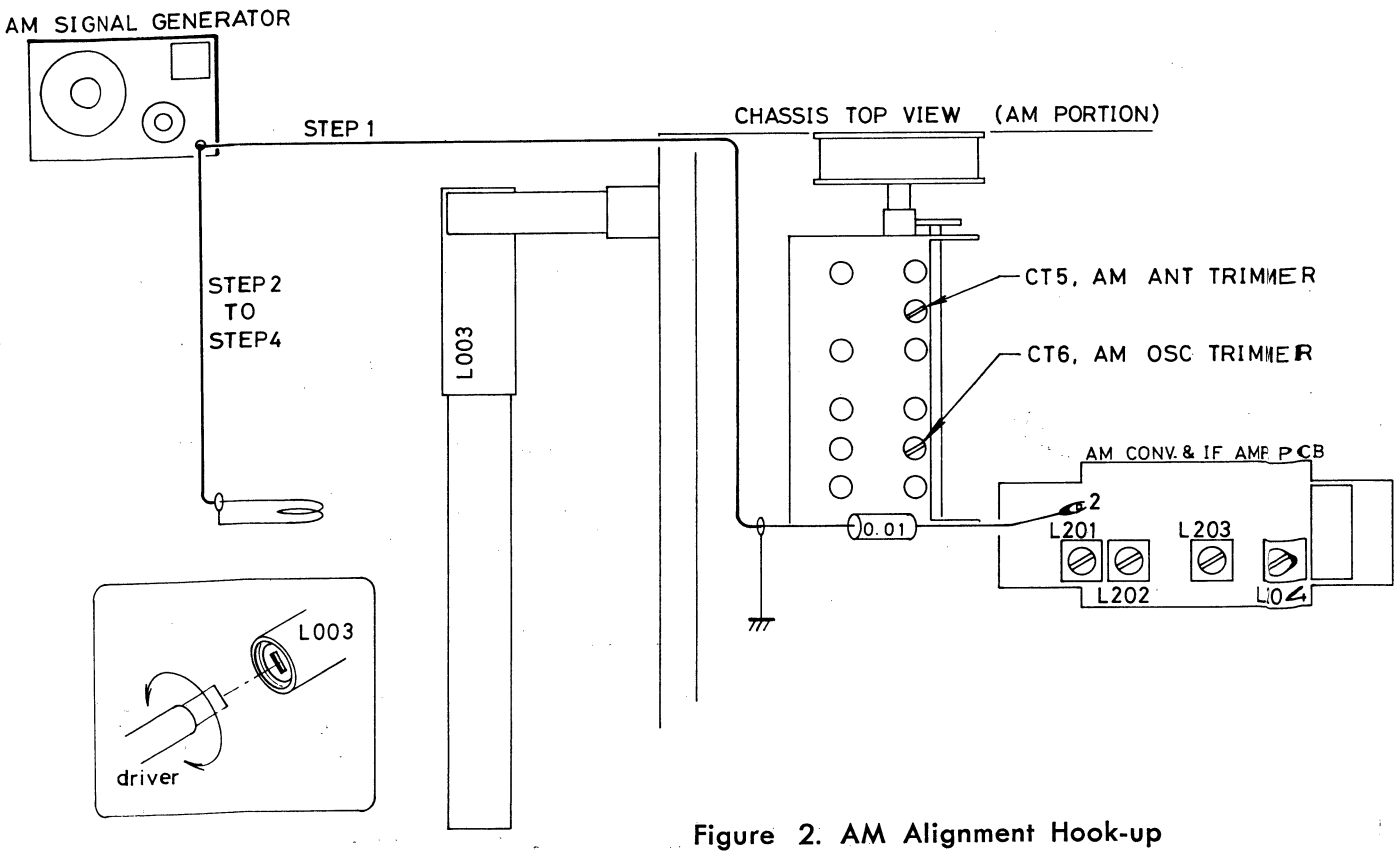


Figure 2. AM Alignment Hook-up

FM IF & RF ALIGNMENT PROCEDURE

Instruments: FM Signal Generator, and H.D Analyzer.

- Set Function Selector to "FM" position.
- Connect FM Signal Generator to FM antenna terminals.
- Connect H.D Analyzer to Monitor-2 "OUT" jack (Left or Right).

A. FM IF Alignment

1. Set the dial of receiver to the point where no interferring appears on band. Adjust IFT, L102 (on FM IF pcb), so that FM Tuning meter (M002) indicates the zero point on the center of the scale.
2. Set the frequency of FM Signal Generator at 98MHz (400Hz, 100% Mod.) and feed it to the FM antenna terminals of receiver. Tune receiver to 98MHz and adjust it so that FM Tuning meter indicates zero (center) point. Then adjust IFT, T1 (on Front-end), so that output level becomes maximum.
3. Next, adjust IFT, L101 (on FM IF pcb), so that reading of H.D analyzer is minimum. When the indication of FM Tuning meter is off from the zero point in spite of the above adjustment, fine adjust L102 so that the FM Tuning meter just indicates zero point.

B. FM RF Alignment [NOTE: Signal Strength must be kept -3dB of limiter satulation.]

1. Set Signal Generator frequency to 90MHz and also the receiver to 90MHz on the dial scale. Then adjust FM OSC. coil, L4 (on Front-end), to obtain a maximum reading on level meter of H.D Analyzer.
2. Change the frequency of Signal Generator to 106MHz, and set the receiver to 106MHz on the dial scale. Then adjust FM OSC trimmer capacitor, CT4 (on Front-end), to obtain maximum reading on level meter of H.D Analyzer.
3. Repeat the above steps 1 and 2 until no further improvement is noticed.
4. Set Signal Generator frequency to 90MHz and also the receiver to 90MHz on the dial scale. Then adjust FM ANT and RF coil, L1, L2 and L3 (on Front-end), to obtain maximum reading on level meter.
5. Change the frequency of Signal Generator to 106MHz, and set the receiver to 106MHz on dial scale. Then adjust FM ANT and RF trimmer capacitor, CT1, CT2 and CT3 (on Front-end) to obtain maximum reading on level meter.
6. Repeat the above steps 4 and 5 until no further improvement is noticed.

C. Signal Strength Meter Level Adjustment

Set Signal Generator frequency to 98MHz, and set the antenna input level to 1-mV by controlling the ATT of Signal Generator.

Receive the signal from Signal Generator, and adjust the potentiometer, VR101 (on FM IF pcb) so that the Signal meter (M001) indicates toward "8" on the scale.

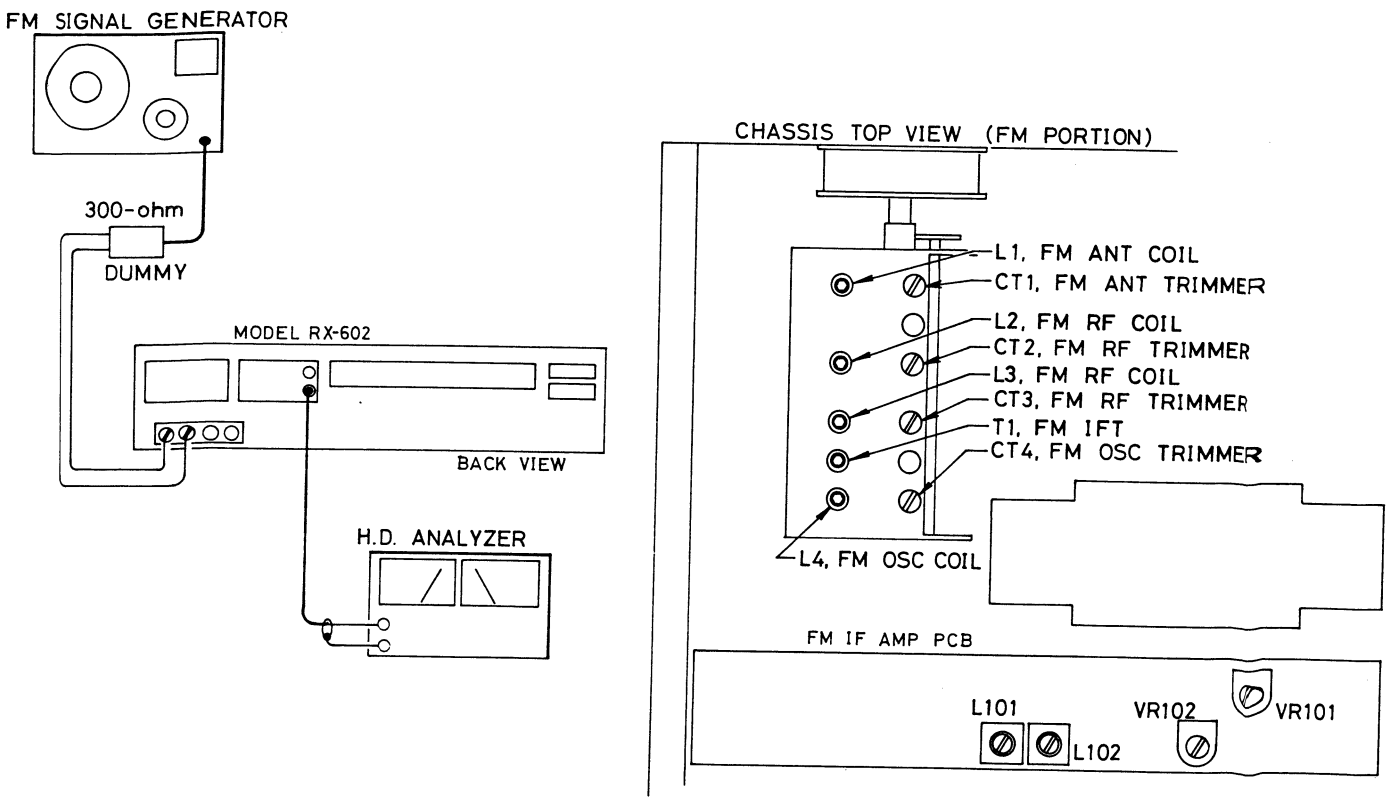


Figure 3. FM IF and RF Alignment Hook-up

FM MPX ALIGNMENT PROCEDURE

Note: The FM IF amplifier alignment must be completed before attempting this MPX alignment. Poor IF alignment will result in poor multiplex adjustment.

Instruments: FM Stereo Generator, AC VTVM and Oscilloscope.

Set potentiometers VR102 (on FM IF pcb), VR301 and VR302 (on MPX pcb) to max-clockwise position before starting this procedure.

Set Function Selector to FM position.

Connect Stereo Generator to FM antenna terminals. And set the frequency at 98MHz (if a disrupting signal appears, select another frequency).

FM Stereo Generator modulation is as follows:

Pilot signal 9%

Modulation Frequency 1KHz (L-ch. only) 90%

1. Connect oscilloscope and AC VTVM to MONITOR-2 OUT right jack. Receiving FM Stereo Generator signal (98MHz), rotate and set the potentiometer VR301 at the middle of range where the MPX circuit functions in Stereo (STEREO INDICATOR is lighting all the way). (See figure 4-2).
2. Then, rotate and adjust potentiometer VR302 so that the leakage of signal into R-ch. is minimum.
3. Switch the modulation of Stereo Generator from left to right, and reconnect oscilloscope and AC VTVM to MONITOR-2 OUT left jack. Then make certain that the level of signal leakage into L-ch. is equal to that into R-ch. in preceding two items. If there is an excessive difference between leak-free effects of both channels, slightly adjust VR302 so that the levels of signal leakage of both channels are equal.

   Separation subsequent to adjustment is as follows:

   32dB and more per 1KHz

   30dB and more per 100KHz

   30dB and more per 10KHz
4. After reducing the modulation of pilot signal of Stereo Generator to zero, increase it gradually and make certain the STEREO INDICATOR lights up when the modulation degree comes to 5%.

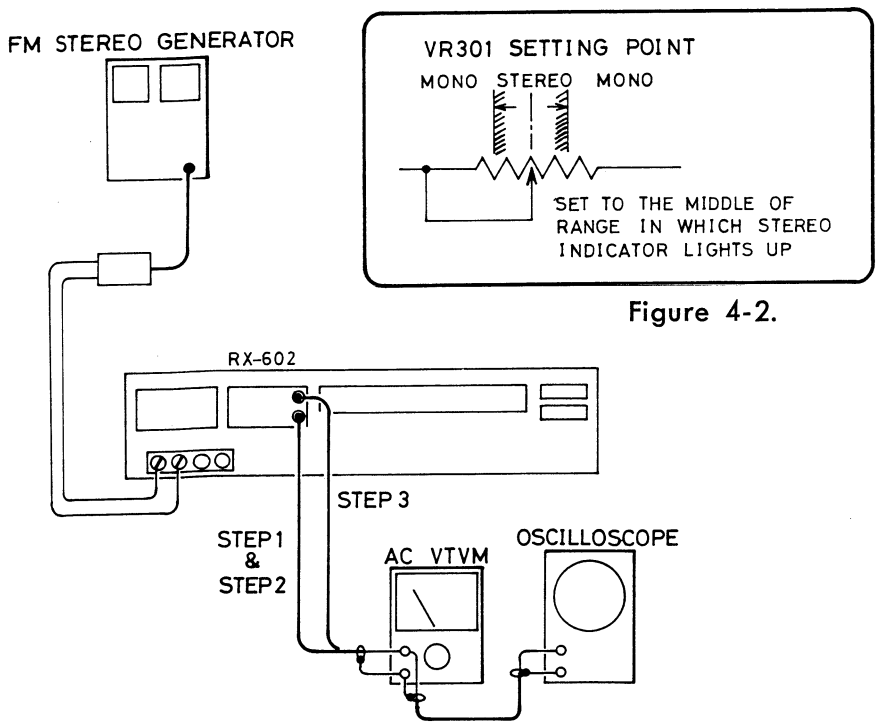


Figure 4-2.

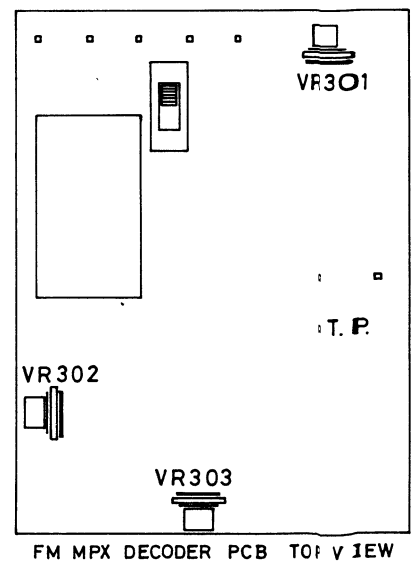


Figure 4. FM MPX Alignment Hook-up

FM MONO-STEREO AUTOMATIC SWITCHING LEVEL ADJUSTMENT PROCEDURE

1. Connect a VTVM and an Oscilloscope to the MONITOR-2 OUT jack (Left or Right).
2. Feed the FM signal whose MPX has been varied into the FM antenna terminals.
   - MPX Variation
     Pilot Signal 9%
     Modulation Frequency 1KHz (L-ch. or R-ch.)
     RF Deviation ±45KHz
3. Set the Frequency at 98 MHz (when there is a disrupting signal, choose another setting).
4. Set the Function Selector to FM position.
5. Set the potentiometer VR102 to counterclockwise position; this is a condition at which Auto-switching does not funciton.
6. Adjust the VR102 so that when the antenna input level is 10μV, Stereo will switch in.
7. After adjustment, check to make sure that, indeed, when the antenna input level is below 5μV, Mono will switch in.

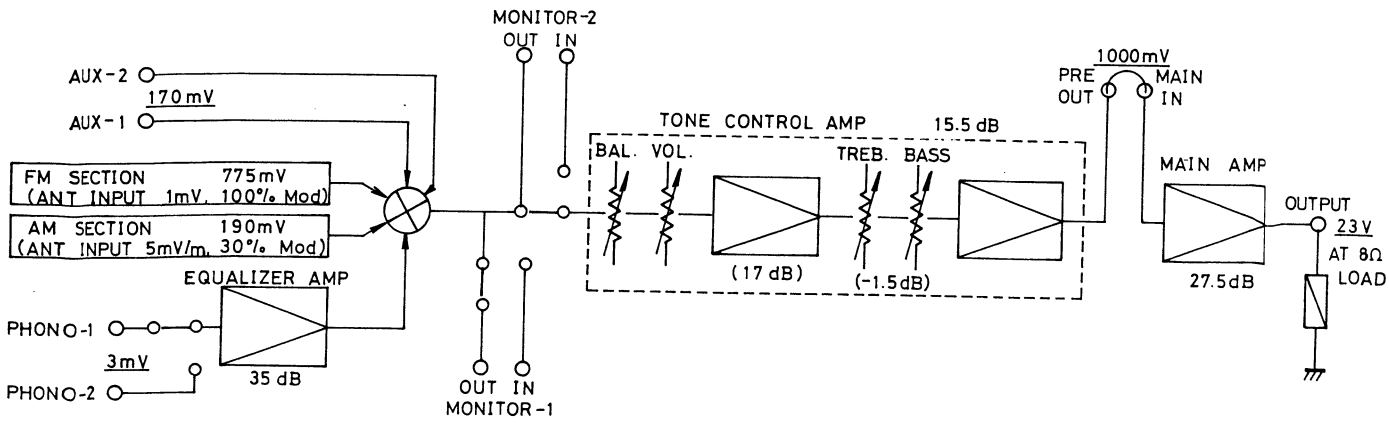
FM MUTING LEVEL ALIGNMENT PROCEDURE

Be sure the FM IF and RF circuits are properly aligned before attempting the FM Muting Level alignment.

Instruments: FM Signal Generator (FMSG) and Oscilloscope (Scope)

1. Set the Function Selector to FM position and FM Muting switch to ON position.
2. Connect FMSG Output to FM antenna terminals and Scope to MONITOR-2 OUT jack (L-ch. or R-ch.)
3. Set the frequency at 98 MHz (when a disrupting signal appears, select another frequency)
4. Turn Potentiometer VR303 (on MPX pcb) fully clockwise, then adjust the FMSG attenuator so that the antenna terminal voltage is 10μV.
5. Turn and adjust Potentiometer until the signal on Scope just vanishes.
6. Check that the signal appears on Scope (at distortion less than 1%) when the antenna terminal voltage is set to 20μV, and disappears when the voltage is reduced from 20μV to 10μV.
   a. When there is high distortion, expedite the FM IF & RF alignment and start again.
   b. When the signal is not vanished at the 10μV input, repeat the steps 4 and 5.

GAIN DIAGRAM



TROUBLE SHOOTING

Unit inoperative

I. If the pilot lamp does not light, check the flow at the AC Outlet and
   A. If no voltage across,
      1. The AC cord may be faulty, or
      2. Connections in the Power Switch may be faulty.
   B. If there is proper voltage across, check the AC fuse F001 and if the AC fuse is blown,
      1. Primary or Secondary winding of Power Transformer T001 may be shorted.

II. If the pilot lamp does light, measure voltage across +B, −B and B1 (see schematic diagram) and
   A. If no voltage across, check to see if the wired-in fuse (F002 or F003) is blown.
      1. If the DC fuse is blown,
         a. Rectifier D901, 902, 903, 904, 905 or 906 may be shorted, or
         b. Capacitor C625, 626, 901, 902, 903 or 904 may be shorted, or
         c. Transistor Q607, 608, 615, 616, 001, 002, 003 or 004 may be shorted.
      2. If the DC fuse is OK,
         a. Rectifier D901, 902, 903, 904, 905 or 906 may be opened, or
         b. Secondary winding of the Power Transofrmer may be opened.

Left or Right channel inoperative

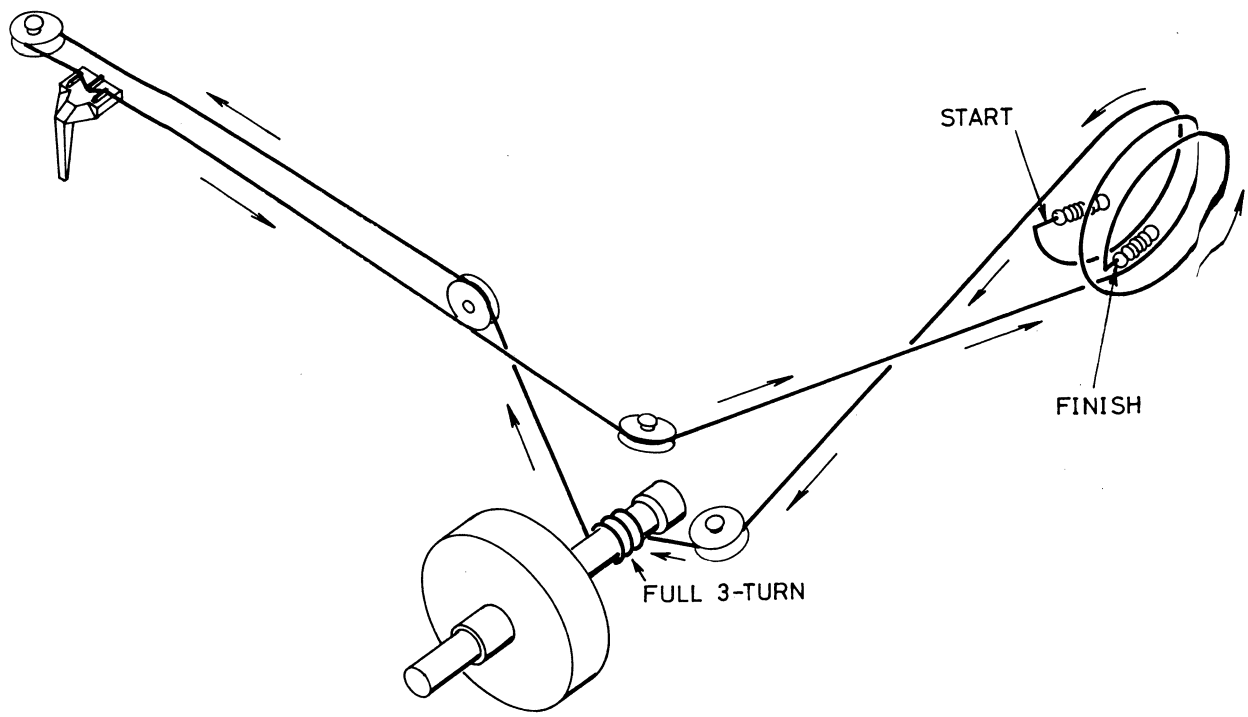
I. If the Left channel is inoperative, check to see if there is a signal at Main Amp. pcb Pin1.
   A. If there is a signal.
      1. Capacitor C601 may be faulty, or
      2. Transistor Q601, 602, or 603 may be faulty.
   B. If there is no signal,
      1. Capacitor C504, 509, 513 or 517 may be faulty, or
      2. Transistor Q501, 502, or 503 may be faulty.

Radio Section inoperative

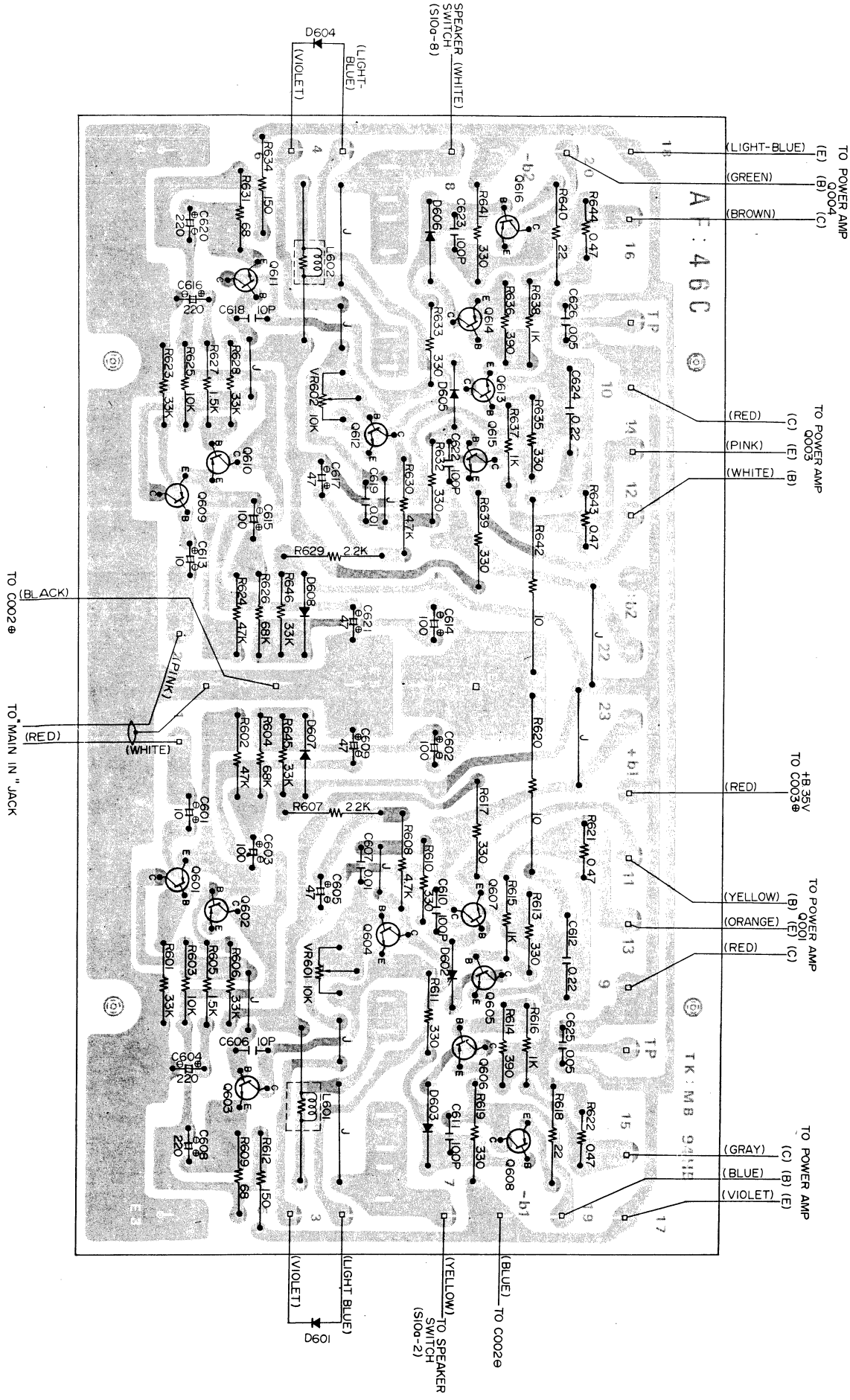
I. AM is inoperative
   A. If there is proper voltage at AM IF pcb Pin b1,
      1. Transistor Q201, 202, 203 or 204 may be faulty, or
      2. Coil L003, 201, 202, 203, 204 or 205 may be faulty, or
      3. Capacitor C220 may be faulty.

II. FM is inoperative
   A. If there is proper voltage,
      1. Transistor Q102, 103 or 106 may be faulty, or
      2. IC101 or 301 may be faulty, or
      3. Coil L101 or 102 may be faulty, or
      4. Capacitor C127, 128 or 301 may be faulty, or
      5. Front-end may be faulty.
   B. At FM Stereo broadcast, the unit only receives in Mono.
      1. Stereo Auto-switching circuit may be faulty, or
      2. IC301 may be faulty.

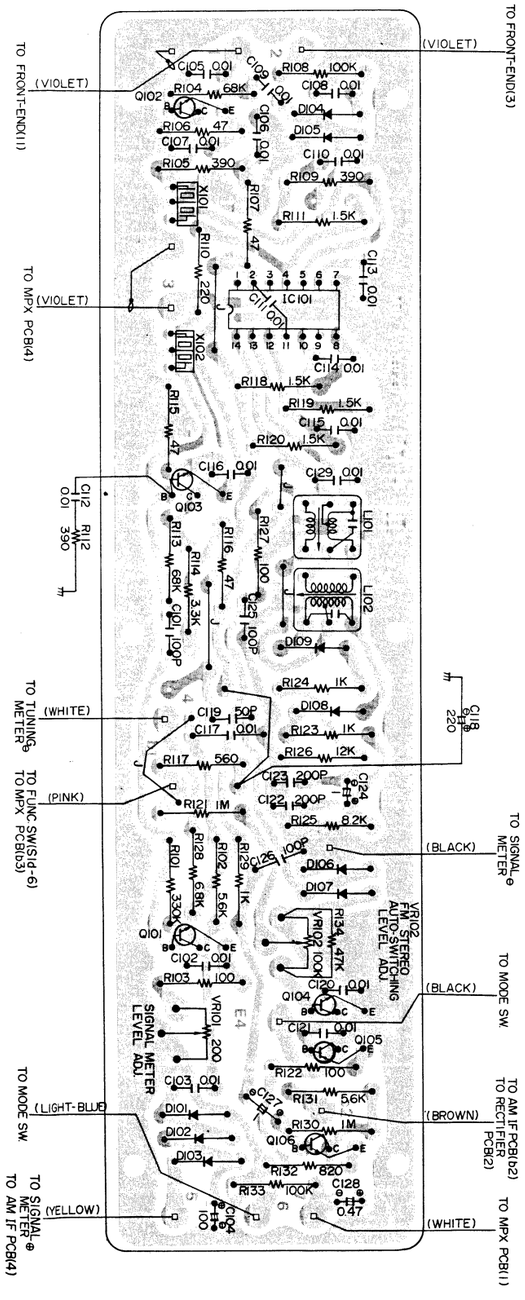
DIAL STRINGING DIAGRAM



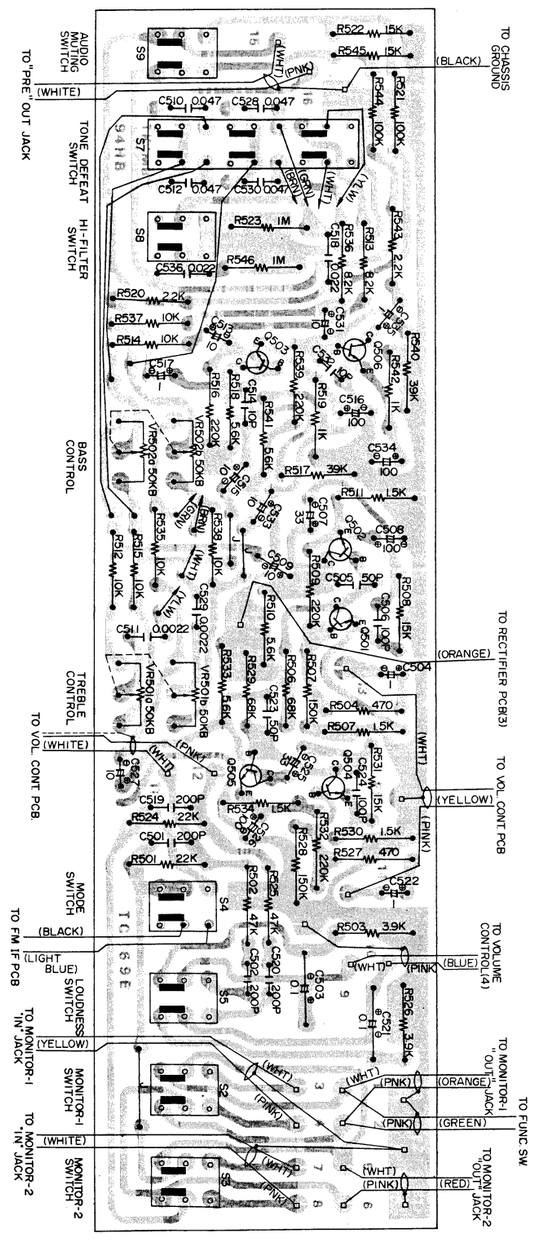
MAIN AMPLIFIER CIRCUIT BOARD DIAGRAM



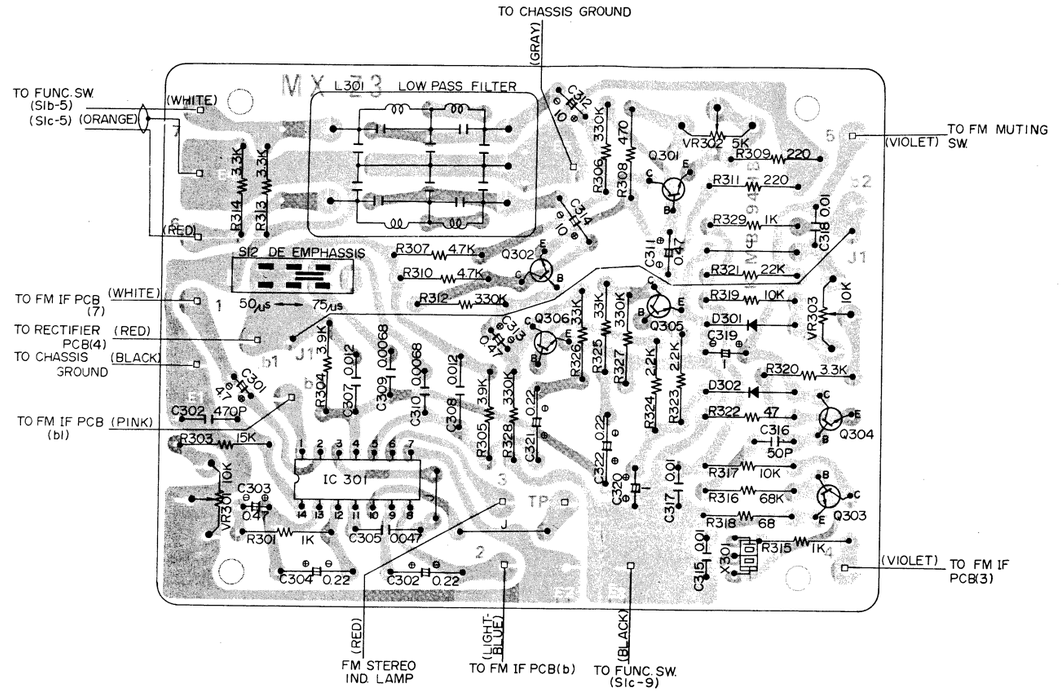
FM IF AMPLIFIER CIRCUIT BOARD DIAGRAM



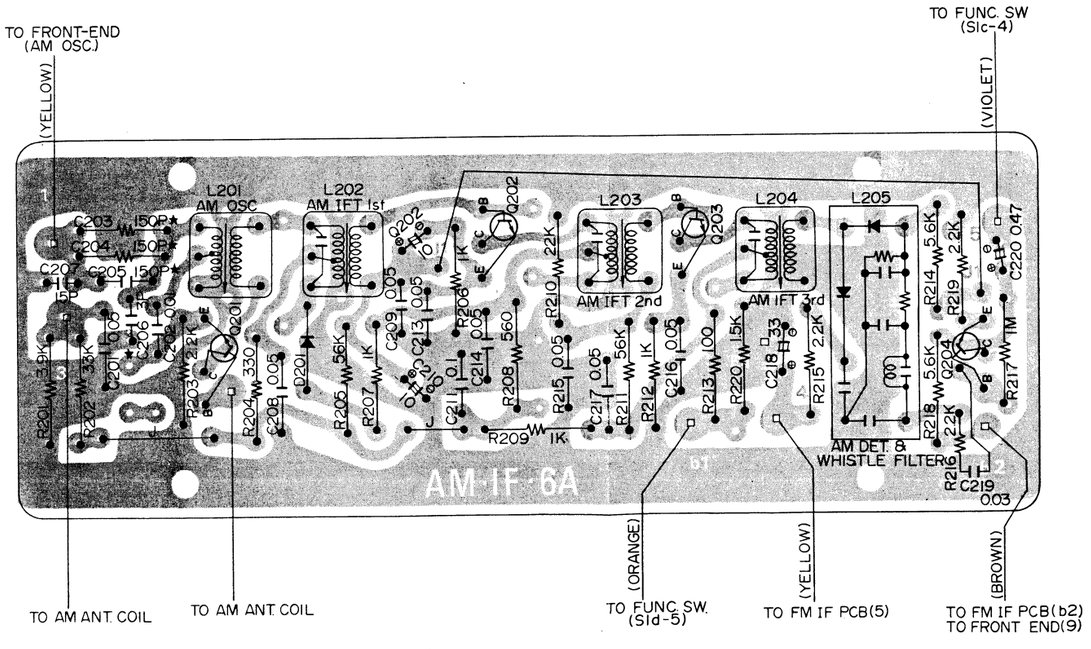
TONE CONTROL AMPLIFIER CIRCUIT BOARD DIAGRAM



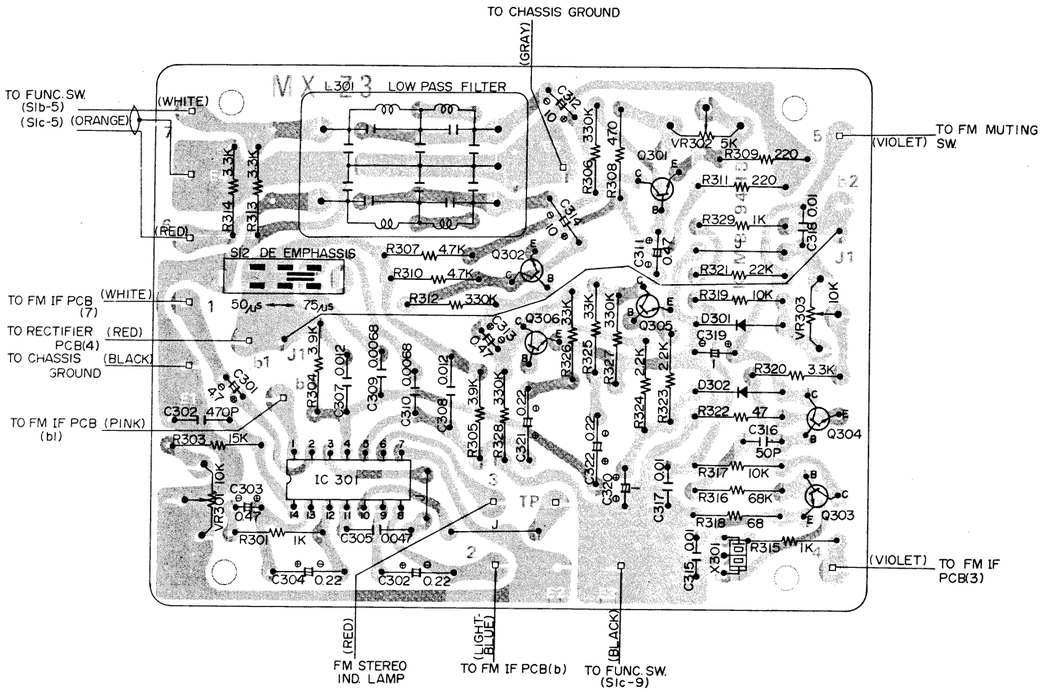
FM MPX DECODER CIRCUIT BOARD DIAGRAM



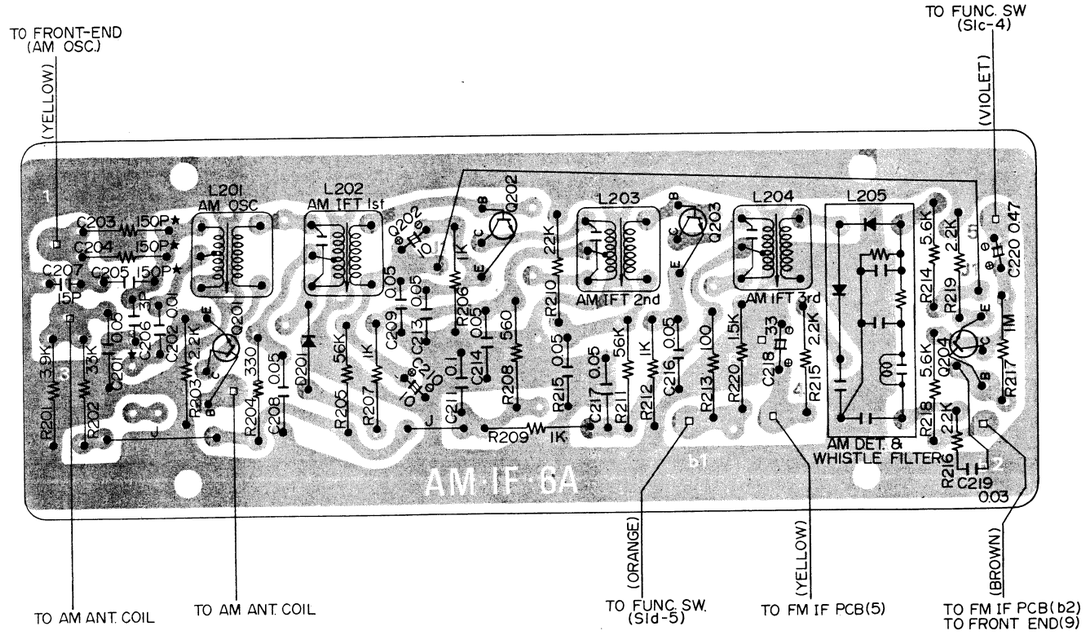
AM CONV. & IF AMPLIFIER CIRCUIT BOARD DIAGRAM



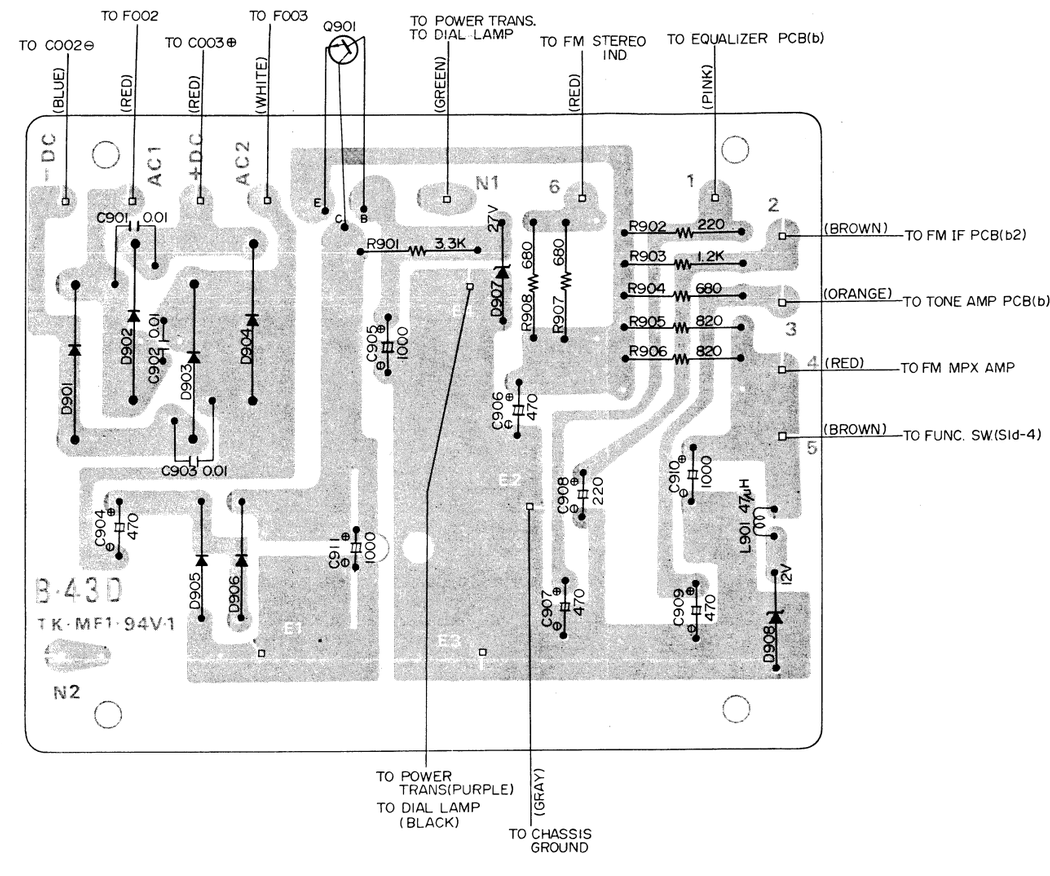
FM MPX DECODER CIRCUIT BOARD DIAGRAM



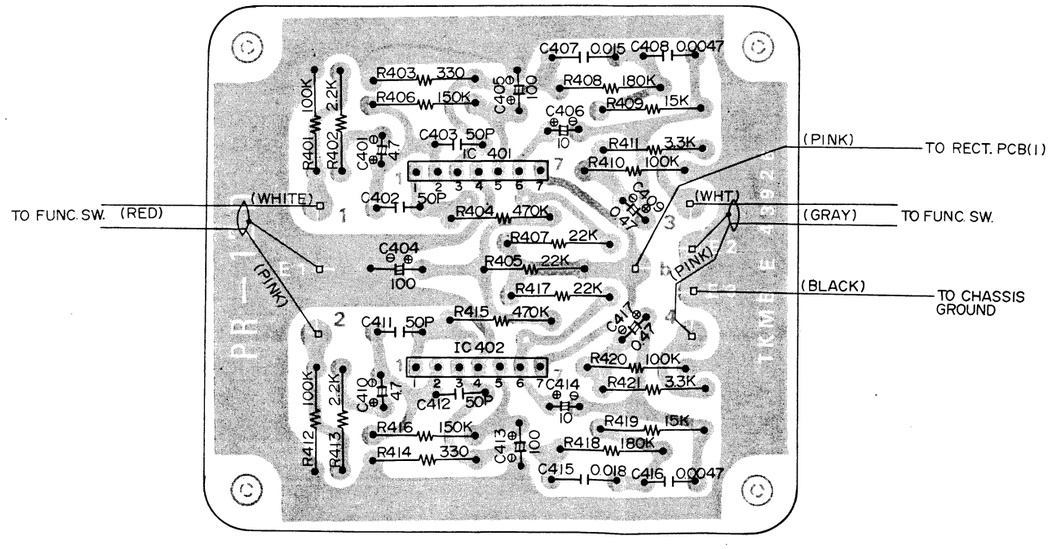
AM CONV. & IF AMPLIFIER CIRCUIT BOARD DIAGRAM



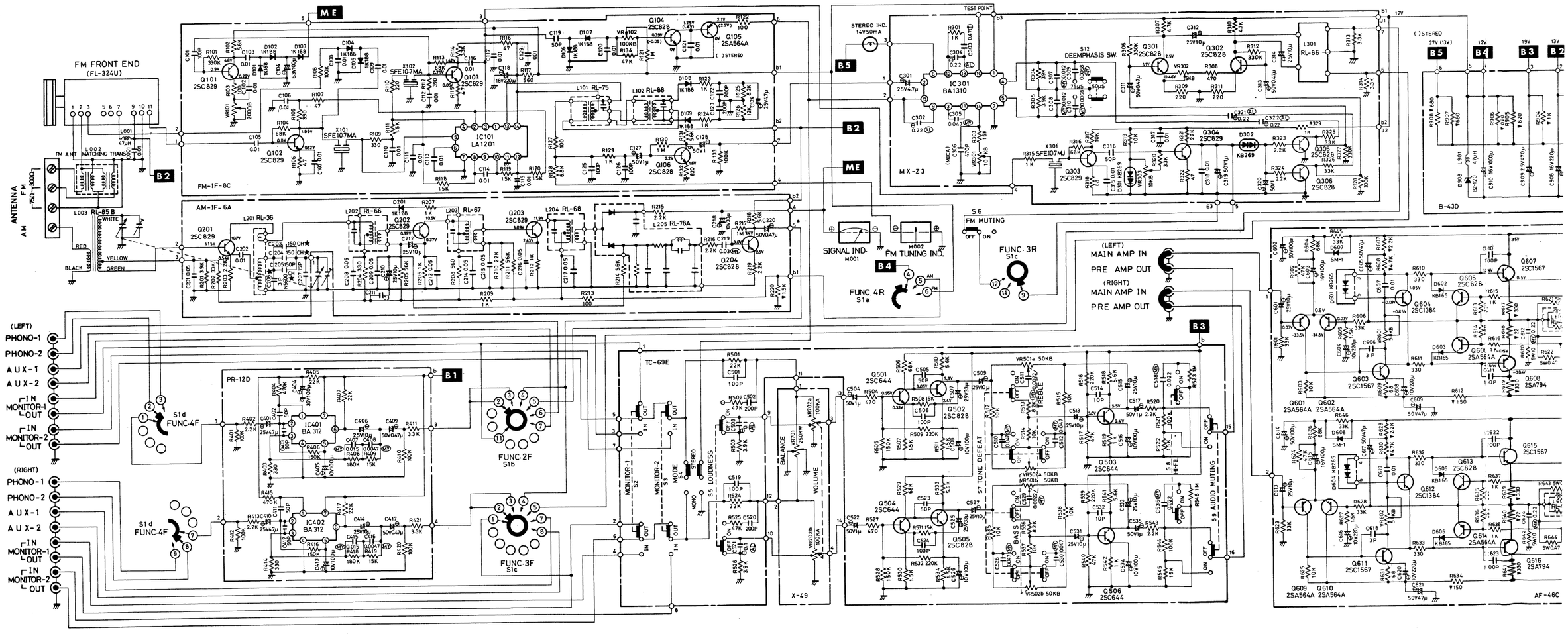
RECTIFIER CIRCUIT BOARD DIAGRAM

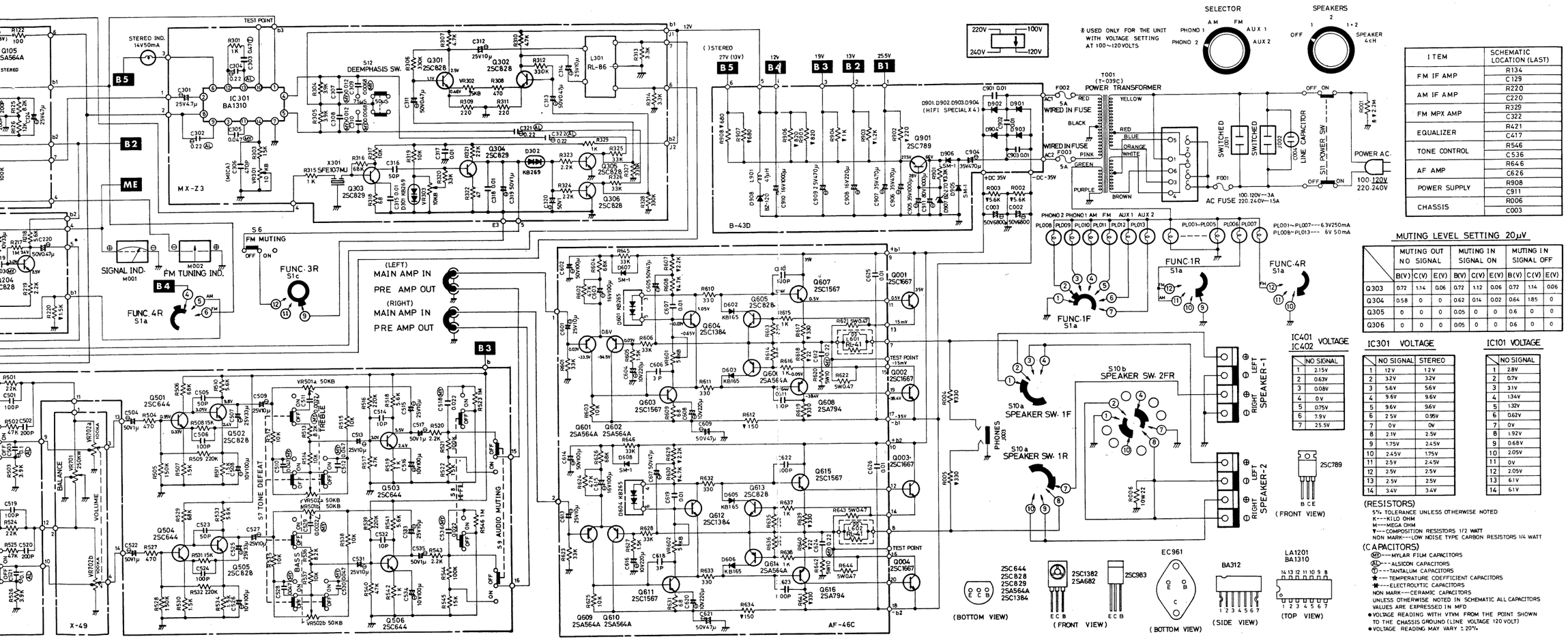


EQUALIZER AMPLIFIER CIRCUIT BOARD DIAGRAM



SCHEMATIC DIAGRAM





ITEM	SCHEMATIC LOCATION (LAST)
FM IF AMP	R134
AM IF AMP	C129
FM MPX AMP	R220
EQUALIZER	C220
TONE CONTROL	R329
AF AMP	C322
POWER SUPPLY	R421
CHASSIS	C417
	R546
	C536
	R646
	C626
	R908
	C911
	R006
	C003

MUTING LEVEL SETTING 20μV

	MUTING OUT NO SIGNAL			MUTING IN SIGNAL ON			MUTING IN SIGNAL OFF		
	B(V)	C(V)	E(V)	B(V)	C(V)	E(V)	B(V)	C(V)	E(V)
Q303	0.72	1.14	0.06	0.72	1.12	0.06	0.72	1.14	0.06
Q304	0.58	0	0	0.62	0.14	0.02	0.64	1.85	0
Q305	0	0	0	0.05	0	0	0.6	0	0
Q306	0	0	0	0.05	0	0	0.6	0	0

IC401 IC402 VOLTAGE

	NO SIGNAL
1	2.15V
2	0.63V
3	0.08V
4	0V
5	0.75V
6	7.9V
7	25.5V

IC301 VOLTAGE

	NO SIGNAL	STEREO
1	12V	12V
2	3.2V	3.2V
3	5.6V	5.6V
4	9.6V	9.6V
5	9.6V	9.6V
6	2.5V	0.95V
7	0V	0V
8	2.1V	2.5V
9	1.75V	2.45V
10	2.45V	1.75V
11	2.5V	2.45V
12	2.5V	2.5V
13	2.5V	2.5V
14	3.4V	3.4V

IC101 VOLTAGE

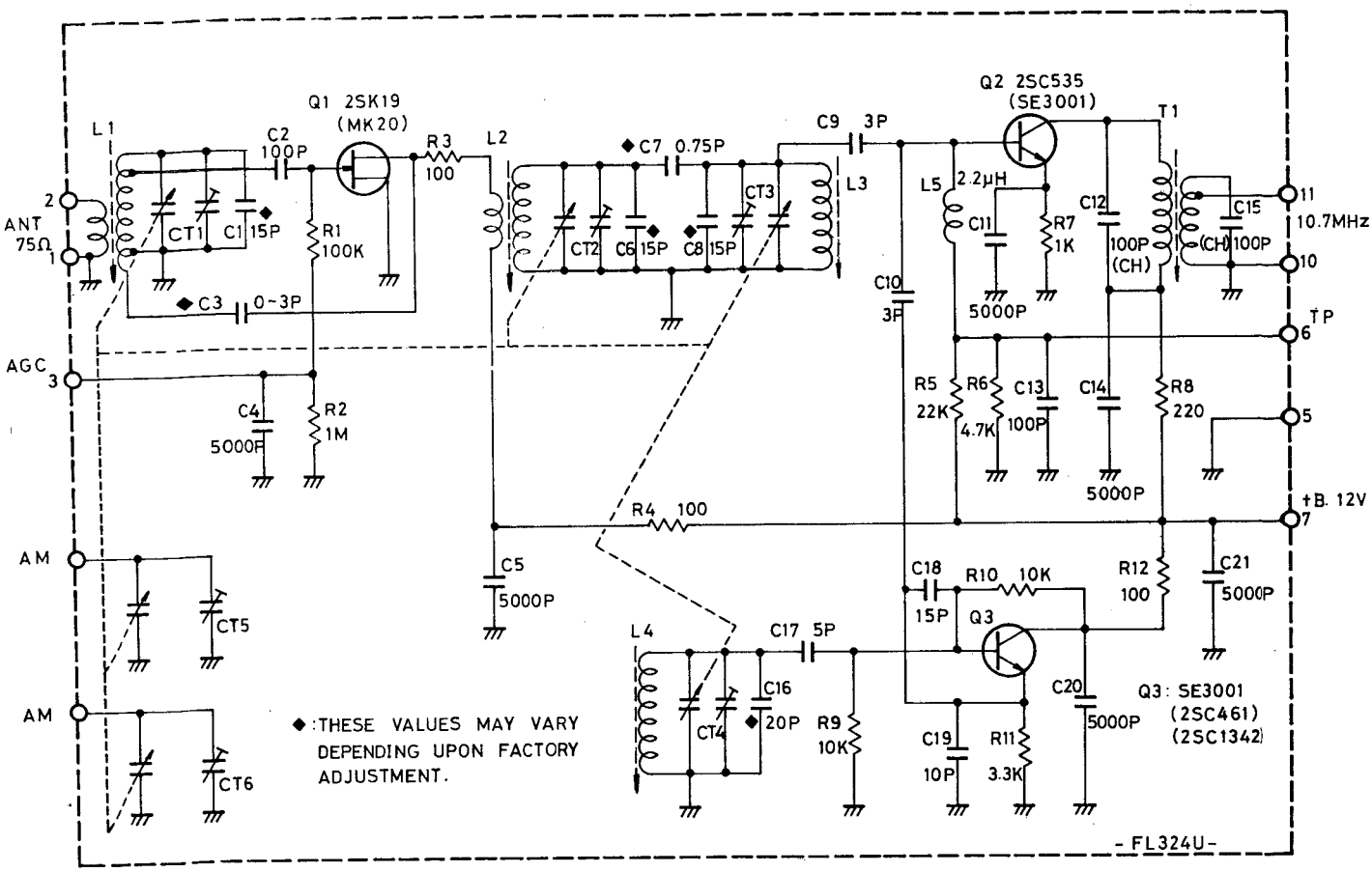
	NO SIGNAL
1	2.8V
2	0.7V
3	3.1V
4	1.34V
5	1.32V
6	0.62V
7	0V
8	1.92V
9	0.68V
10	2.05V
11	0V
12	2.05V
13	6.1V
14	6.1V

(RESISTORS)
5% TOLERANCE UNLESS OTHERWISE NOTED
K---KILO OHM
M---MEGA OHM
▼---COMPOSITION RESISTORS 1/2 WATT
NON MARK---LOW NOISE TYPE CARBON RESISTORS 1/4 WATT

(CAPACITORS)
(MY)---MYLAR FILM CAPACITORS
(AL)---ALSICON CAPACITORS
(T)---TANTALUM CAPACITORS
(TH)---TEMPERATURE COEFFICIENT CAPACITORS
(E)---ELECTROLYTIC CAPACITORS
NON MARK---CERAMIC CAPACITORS
UNLESS OTHERWISE NOTED IN SCHEMATIC ALL CAPACITORS VALUES ARE EXPRESSED IN MFD

- VOLTAGE READING WITH VTVM FROM THE POINT SHOWN TO THE CHASSIS GROUND (LINE VOLTAGE 120 VOLT)
- VOLTAGE READING MAY VARY ±20%

FRONT-END SCHEMATIC DIAGRAM



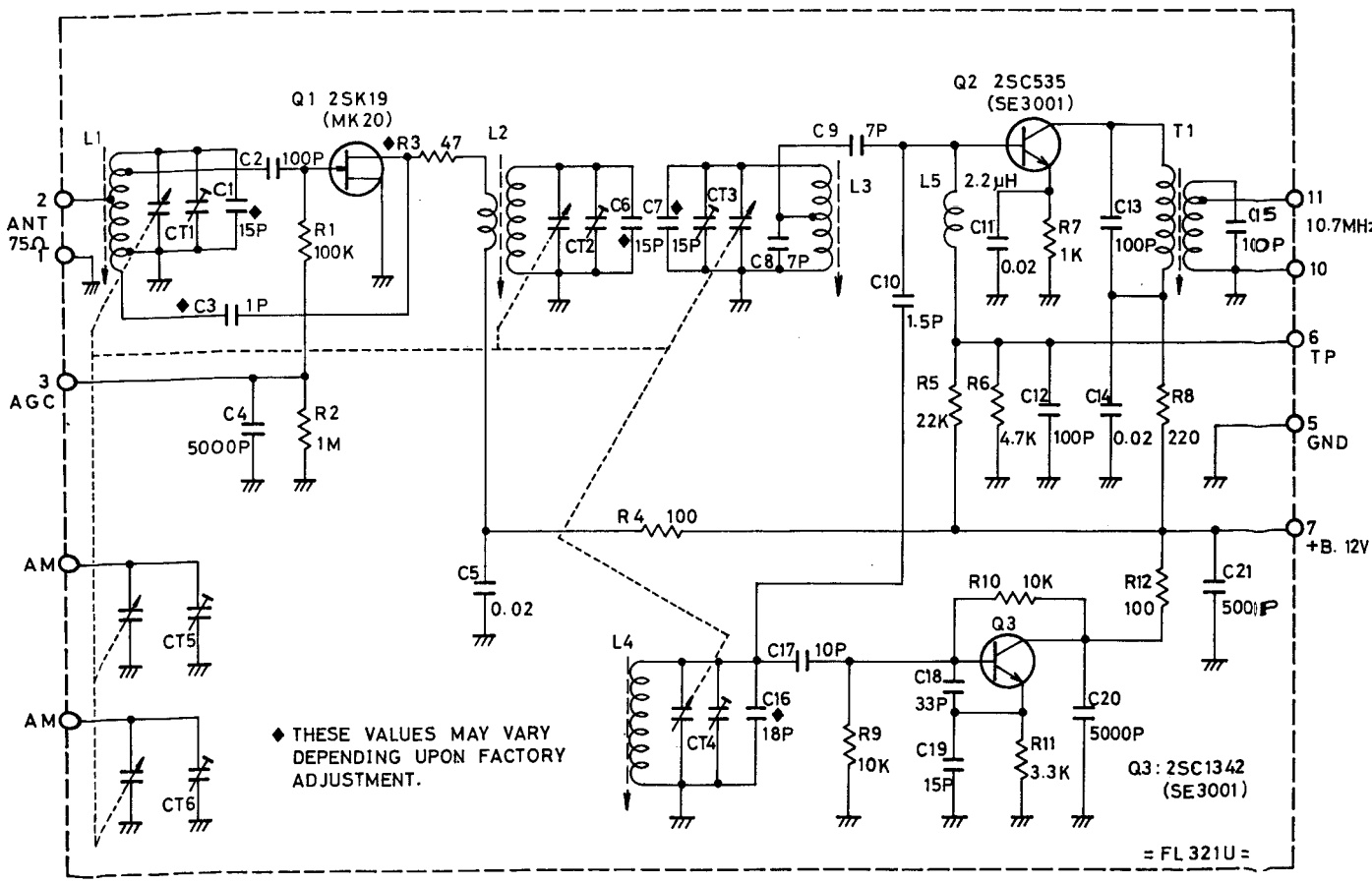
BANDPASS FILTER REPLACEMENT

Bandpass Filters X101, 102 and 103 incorporated in FM IF circuit are classified into 5 divisions according to their center frequencies. It is thus necessary to use the same frequency division in case of exchanging the Bandpass Filters. Divisions of bandpass frequencies are indicated by colored dots as shown in the following chart.

COLOR	CENTER FREQ.	TOLERANCE
Red	10.70MHz	±30KHz
Blue	10.67MHz	±30KHz
Orange	10.73MHz	±30KHz
Black	10.64MHz	±30KHz
White	10.76MHz	±30KHz

ADDENDUM

1. The following changes are applied to the units with serial numbers of Ⓖ48980 and above, and Ⓛ03651 and above.
   a. The value of resistor R115 of emitter Q103 in the FM IF amplifier is changed from 47 ohms to 2.2K ohms.
   b. C130, 0.01 mfd is added in parallel with Ⓡ115.
   reason: to improve auto-switching characteristic of FM MONO-STEREO
2. The following changes are applied to the units with serial numbers of Ⓖ49847 and above, and Ⓛ11231 and above.
   a. The values of potentiometers VR601 and VR602 in the main amplifier are changed from 10K ohms to 5K ohms.
   b. 1) The values of resistors R517 and R540 of bases Q503 and Q506 in the tone amplifier are changed from 47K ohms to 39K ohms.
   2) The value of resistor R904 in the power supply circuit is changed from 1K ohms to 680 ohms.
   reason: a. to improve the accuracy of bias adjustment.
   b. to improve the characteristic in over-input
3. The following changes are applied to the units with serial numbers of Ⓖ53039 and above, Ⓛ58691 and above and Ⓡ17321 and above.
   a. AM/FM Front-end circuit is changed. Accordingly, the model number of Front-end is changed from FL324U to FL321U (Part No.321304378). The dial scale is not changed.
   b. 1) Q603 and Q611 in main amplifier are changed from 2SC983 to 2SC1567(R)〈Part No.301201150〉: hfe rank designated.
   2) Q607 and Q615 are also changed from 2SC1382 to 2SC1567 (Q or R rank)
   3) Q608 and Q616 are also changed from 2SA682 to 2SA794 (Q or R rank)〈Part No.301001131〉.
   4) According to the items 2) and 3) above, values of C606 and C618 are changed from 10pF to 3pF.
   5) Q001, 002, 003 and 004 in power amplifier are changed from EC-961 to 2SC1667 (Part No. 301201154).
   Note: a. According to the changes of transistors in main amplifier, radiation fin used in driver transformer goes out of use.
   b. When replace the driver or power amplifier transistor in the units prior to changes of the preceding item b of 3, be sure to change them in pairs. Avoid to use the old transistor together.
   c. When renew pre-driver transistor Q603 or Q611, change the value of neutralizing capacitor C606 or 618 from 10pF to 3pF.



REPAIR PARTS LIST

Schematic Location	Part No.	Description
COILS and TRANSFORMERS		
L101	225501125	FM IFT, Ratio (Pri.)
L102	225501127	FM IFT, Ratio (Sec.)
L201	223301123	AM OSC., Coil
L202	225301125	AM IFT, 1st
L203	225301126	AM IFT, 2nd
L204	225301127	AM IFT, 3rd
L205	228641115	AM Whistle Filter
L301	228641118	FM MPX Low Pass Filter
L601,602	220401120	Anti-parasitic Coil
L901,001	220001121	RF Choke, 47μH
L002	226501121	FM ANT MATCHING TRANS.
L003	222391123	AM Antenna Coil Assembly
T001	205001368	Power Supply Transformer (Multi-voltage)
	201001368	Power Supply Transformer (117V only)*1
	202001376	Power Supply Transformer (220V only)*2
		(*1 CSA Approved Type)
		(*2SEMKO Approved Type)
TRANSISTORS, DIODES and IC's		
Q101,102 Q103,201 Q202,203 Q303,304	301201117	2SC829(C), FM IF Amp., AM Conv. AM IF Amp., FM Muting Amp., etc.
Q104	301201149	2SC828(S or T), FM ST. Auto-switching Trigger
Q105,601 Q602,606 Q609,610 Q614	30100117	2SA564A(P or Q), Differential Amp., Protector, etc.
Q106,204 Q301,302 Q305,306 Q502,505 Q605,613	301201117	2SC828(R), FM Audio Amp., AM Audio Amp., FM Muting, Tone Amp., etc.
Q501,503 Q504,506	301201114	2SC644(S), Tone Amp.
*3 Q603,611	301201137	2SC983(Y), Pre-driver
*4 Q604,612	301201132	2SC1384, Temperature Compensator
*4 Q607,615	301201136	2SC1382(Y), Driver
*5 Q608,616	301001125	2SA682(Y), Driver
Q901	301201142	2SC789, Stabilizer
*6 Q001,002 Q003,004	301901122	EC-961, Power Amp.
D101,102 D103,104 D105,106 D107,108 D109,201	30111008	1K188, FM Det., FM AGC, etc.
D301,302	300212004	KB-269, FM Muting Bias
D601,604	300212002	KB-265, Power Amp. Bias
D602,603 D605,606	300212008	KB-165, Overload Protector Bias
D607,608 D905,906	300919016	SM-1-08, Rectifier for pre-amp & Radio Section, etc.
D901,902 D903,904	300919017	Hi-Fi SPECIAL, Rectifier for Main Amp.
D907	300313006	BZ-270, Zener Regulator, 27V
D908	300313004	BZ-120, Zener Regulator, 12V
IC101	303452148	LA1201, AM/FM IF Amp.
IC301	303452151	BA1310 or HA1156, FM MPX Decoder
IC401,402	303452150	BA312, Phono Equalizer Amp.
VARIABLE RESISTORS		
VR101	510502129	200-ohm B, FM Signal Meter Level Adj.
VR102	510502130	100KB, FM Stereo Autoswitching Level Adj.
VR301,303	510502125	10KB, FM Stereo Adj., FM Muting Level Adj.
VR302	510502121	5KB, FM Separation Adj.
VR501,502	525101130	50KB, Bass and Treble Control
VR601,602	510502128	5KB, Power Amp. Bias Adj.
VR701	525121125	250KW + 100KAT x 2, Balance & Volume Control
MISCELLANEOUS		
M001	231310028	Meter, AM/FM Signal Strength
M002	231310027	Meter, FM Center Tuning
	321304376	AM/FM Front-end
S1	601011263	Switch, Function Selector
S2,3 S4,5	614040812	Switch, Push 4-key, (Monitor, Mode, Loudness)
S6,7 S8,9	614040813	Switch, Push 4-key, (Tone Def., Muting etc.)
S10	601011264	Switch, Speakers Selector
S11	614010107	Switch, Power Supply
S12	613000024	Switch, FM De-emphasis
X101,102	229101134	FM IF Bandpass Filter
X301	229101139	FM IF Bandpass Filter
PL001-007	352063025	Lamp, 6.3V, 0.25A, Dial & Meter Light
PL008-013	351060005	Lamp, 6V, 50mA, Function Indicator
PL014	351140005	Lamp, 14V, 50mA, FM Stereo Indicator
	141110143	AM Conv. and IF Amp. Circuit Assembly
	141210150	FM IF Amp. Circuit Assembly
	141411447	FM MPX Decoder Circuit Assembly
	141510148	Phono Equalizer Amp. Curcuit Assembly
	141710258	Tone Control Amp. Curcuit Assembly
	141610261	Main Amp. Circuit Assembly
	141810604	Rectifier Circuit Assembly
	141810605	Volume Control Circuit Assembly

*3 2SC1567(R)〈Part No.301201150〉is applicable in place of 2SC983. hfe rank should be (R) rank.

*4 2SC1567(R or Q)〈Part No.301201153〉is applicable in place of 2SC1382†1.

*5 2SA794(Q or R)〈Part No.301001131〉is applicable in place of 2SA682†2.

†1, †2: Be sure Q607 and Q608 are used in pairs and of same hfe rank.

*6 2SC1667(P or Q)〈Part No.301201154〉is applicable in place of EC-961. Be sure to use them in pairs.

Note: 1. It is recommended to use the Q601 and 602 of the same hfe rank in differential amplifier.